## REMARKS

**Status of the Application**

Claims 1-4 were previously pending. Claims 1-2 were rejected under 35 USC 102(b) as being anticipated by Miyashita et al. (US 6,437,649). Claims 3-4 were objected to for depending on a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim.

Applicant has amended claims 2-4, and canceled claim 1. No new matter adds through the amendments. For the reasons discussed below, withdrawal of the rejections is requested.

**Claim Rejections- 35 U.S.C. 102(b)**

Claims 1-2 were rejected under 35 USC 102(b) as being anticipated by Miyashita et al. (US 6,437,649).

Applicant has canceled claim 1, thus, the rejection to claim 1 is moot.

Claim 2 are amended to include all of the limitations of claim 1. Applicant respectfully traverses the rejection to claim 2 for reasons discussed below.

According to the present invention as defined in claim 2, in an amplification circuit having an input signal preservation unit and an output signal preservation unit,

the input signal preservation unit includes:

a bias resistor connected in parallel with an input terminal of the amplification device; and

a reactor that is connected in series with the bias resistor to serve as an AC resistor and increase an input impedance value together with the bias resistor for thereby preventing a leakage of the AC signal input signal.

**(1) With respect to the operation of the invention claimed in claim 2:**

Referring to FIG. 1 of the instant application that shows the related art, only a resistor R1 exists as an input signal preservation unit or an auto bias resistor. However, referring to FIG. 2a that shows an embodiment of the invention claimed in claim 2, an inductor L1 is provided in

addition to the resistor R1. The reason for providing the inductor L1 is as follows:

If the L1 is provided together with the R1, the AC impedance can be expressed as R1+wL1 (w is a frequency). When the L1 serves as a DC resistor with respect to the bias (DC component), the L1 functions as a short circuit, so the L1 substantially has no resistance component. Thus, the DC impedance can be expressed as R1+0*L1 = R1 (that is, w = 0).

In contrast, the AC impedance can be expressed as R1+wL1 with respect to the audio signal having the AC component.

Therefore, the bias (DC component) is influenced exclusively by the resistor R1 when determining the operating point of the amplification device.

In addition, since the audio signal Vi1 having the AC component is input under the higher impedance of R1+wL1, the leakage of the input audio signal Vi1 can be prevented (the input signal can be reliably delivered).

That is, the amplification device can be prevented from being broken and the audio signal can be prevented from being leaked thanks to the addition of the L1.

In detail, the bias (DC component) being input under the R1 and the audio signal (AC component) being input under the condition of R1+wL1 can be effectively delivered to the amplification device while preventing the amplification device from being broken by the high bias.

**(2) Difference between the invention claimed in claim 2 and Miyashita's invention:**

The Office Action indicates that the combination of R1 and L1 shown in FIG. 2 of the claimed invention is anticipated by the combination of the R4 and the variable inductor shown in FIG. 3B of Miyashita.

Miyashita's invention has a variable inductor Lv and the value of the Lv becomes smaller when the input signal power increases (please refer to, column 3, third paragraph of the

related invention "... Thus, the first inductor becomes smaller accordingly as the input signal power increases whereby the impedance matching of the input matching circuit can be kept ...".

However, as disclosed in Miyashita (please refer to, from line 54, column 5 to line 42, column 6), the detailed circuit structure of the R4 and the variable inductor shown in FIG. 3B is illustrated in FIG. 3A, and FIG. 3B schematically shows the equivalent circuit of the Lv consisting of TR, Qa, R3, Cb, Lc, etc.

That is, the Lv is schematically shown in FIG. 3B for convenience and the detailed structure of the Lv is shown in FIG. 3A as a combination of R3, Qa, Cb, Lc, etc.

It can be understood from the above description that the R1 and L1 of the claimed invention is different from the Lv of Miyashita.

The difference in effect between the claimed invention and that of Miyashita will be discussed below in detail.

The Lv of Miyashita operates as follows:

In FIG. 3B, supply voltage Vb3 of the variable inductor Lv is not the bias of the first amplification TR, Qd shown in FIG. 1, but the voltage for the equivalent circuit of the variable inductor Lv. The voltage for driving the circuit (combination of TR, R3, Cb, Lc, etc.) shown in FIG. 3A is Vcc.

Therefore, the Vcc shown in FIG. 3A is equivalent to the Vb3 shown in FIG. 3B although they are represented by different characters. The reason for this is disclosed in the related invention in detail (please refer to, from line 54, column 5 to line 42, column 6).

Although the Vcc (=Vb3) is shown in FIGS. 3A, 4A, and 4B, Miyashita fails to explain the details of the Vcc.

In addition, in the circuit structure for constituting the variable inductor Lv, R3 of the bias voltage Vb1 of the TR, Qa is simply described as a resistor R3 in the embodiments shown in

FIGS. 5 to 7 without additional description therefor. Therefore, the Vb3(=Vcc) shown in FIG. 3B of the related invention is not the bias for the first amplification TR, Qd shown in FIG. 1 of the related invention. In contrast, the combination of the R1 and L1 of the claimed invention is the bias for the first amplification transistor. Thus, it can be clearly understood that the combination of the R1 and L1 shown FIG. 2 of the claimed invention is different from the Lv shown in FIG. 1 of the related invention.

Furthermore, in FIG. 1 of the related invention, the bias of the first amplification TR, Qd is obtained by combining a resistor Rext with a fixed inductor Lb. In other words, it is obvious that the Vb3 is not the bias of the first amplification TR, Qd.

Hereinafter, applicant will explain the combination of the R1 and L1 shown in FIG. 2 representing claim 2 of the present invention.

The combination of the R1 and L1 of the claimed invention constitutes the bias of the amplification device while remarkably increasing the input impedance. If the inductor L1 is added serially to the resistor R1, the input impedance is significantly increased without changing the bias due to the reactor component of the L1 (the combination of the R1 and L1 may serve as strong AC impendence with respect to the AC audio signal applied to the amplification device).

In contrast, the combination of the R1 and L1 may serve as a wire with respect to the bias (DC component), so power consumption rarely occurs and the amplification device is prevented from being broken by the excessive bias.

That is, the combination of the R1 and L1 shown in FIG. 2 of the claimed invention is different from the Lv, which is the combination of the R4 and the variable inductor, in terms of the construction and effect.

In other words, the supply of the bias voltage and amplification of the audio signal can be reliably and simultaneously achieved by the combination of the R1 and L1 of the claimed

invention. The construction and effect of the R1 and L1 are different from those of the Lv of Miyashita, which is not the bias of the first amplification TR, Qd.

Hereinafter, applicant will explain the difference in effect between the claimed invention and Miyashita's invention.

The claimed invention increases the input impedance within the limited bias of the amplification device by using the combination of the R1 and L1, thereby maximizing the amplification efficiency. That is, the combination of R1 and L1 can set the bias and increase the input impedance, thereby improving the amplification efficiency.

In contrast, the Lv of Miyashita intends to solve the problems derived from the increase of the signal power input to the first amplification TR, Qd. That is, the related invention minimizes the distortion of the signal output from the first amplification TR, Qd, prevents the bias from being increased due to the excessive input signal power applied to the first amplification transistor, and reduces battery consumption. To this end, Miyashita's invention allows the signal power to be properly bypassed to the ground through the variable inductor Lv, thereby preventing the excessive signal power from being input to the first amplification TR, Qd.

That is, different from the audio signal amplification circuit of the claimed invention having the purpose and effect for preventing the bypass of the signal, Miyashita's invention intends to bypass the signal to be amplified. That is, the purpose of Miyashita's invention is to bypass a part of the increased signal power to the ground through the variable inductor Lv such that the signal power can be properly input to the base of the first amplification transistor.

In the claimed invention, the inductor L1 serves to apply stable bias to the amplification device while remarkably increasing the input impendence to prevent the bypass of the AC audio signal, thereby enhancing the amplification efficiency.

In contrast, in Miyashita's invention, the variable inductor Lv serves to bypass the signal

power in such a manner that the signal power can be prevented from being excessively applied to the base of the first amplification TR, Qd. To this end, before the signal power is input to the first amplification TR, Qd, the increased signal power is partially bypassed to the ground through the Lv and the amount of the signal power is adjusted through the Cv such that the signal power can be properly input to the first amplification TR, Qd, thereby minimizing distortion of the output signal.

Therefore, the only similar component between the claimed invention and Miyashita's invention is that they both adopt an inductor. However, Miyashita's invention adopts the variable inductor for bypassing the signal, and the claimed invention adopts the inductor for preventing the bypass of the signal. It is obvious that the function and effect of devices may vary depending on the construction and purpose thereof. For reference, according to Miyashita's invention, the amplification efficiency may be lowered due to the bypass of the signal power, which is completely different from the claimed invention.

Furthermore, the purpose of the claimed invention is different from that of Miyashita's invention. The reason for this is that the claimed invention copes with the frequency of about 20Hz to 20kHz and receives the audio signal from a source through a wire, but Miyashita's invention copes with the frequency of about 300Mhz to 300GHz and receives the signal power from a signal source (base station) through a wireless manner when operating the cellular phone.

That is, in Miyashita's invention, variation of the signal power input to the cellular phone relates to the distance between the cellular phone and the base station.

However, when amplifying the audio signal having the frequency of about 20Hz to 20kHz as claimed in claim 2, the excessive power rarely occurs, so the restriction of the excessive power is not necessary.

For reference, different from Miyashita's invention dealing with the ultra-high frequency,

the audio signal amplification circuit according to the claimed invention deals with a relatively low frequency band, so a low-frequency choke coil can be used as the inductor L1.

Although the function of the low-frequency choke coil may vary depending on the circuit construction, in general, the low-frequency choke coil substantially serves as a short circuit with respect to the signal having the frequency above 90MHz due to the resonant phenomenon.

In conclusion, the invention claimed in claim 2 has a purpose completely different from that of Miyashita's invention, so the construction and effect of the claimed invention are also different from those of Miyashita's invention.

For at least the reasons discussed above, Miyashita cannot anticipate claim 2 and its dependent claims 5-6. Withdrawal of the rejection is requested.

**Claims 3-4**

Claims 3-4 were objected to for depending on a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim.

Accordingly, Applicant has amended claims 3-4 to include all of the limitations of their base claims. Therefore, the amended claims 3-4 are allowable.

**Conclusion**

In view of the foregoing amendments and remarks, it is respectfully submitted that the remaining claims are now in condition for allowance. Allowance of this application is earnestly solicited.

Respectively submitted
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